DOCUMENT RESUME

ED 041 072 UD 010 317

AUTHOR Mayeske, George W.; And Others
TITLE The Role of Family Background in the Development of Student Achievement and Motivation at the Individual and School Level.
INSTITUTION Office of Education (DHEW), Washington, D.C. Office of Program Planning and Evaluation.
REPORT NO TP-5
PUB DATE 28 Oct 69
NOTE 30p.

EDRS PRICE EDRS Price MF-$0.25 HC-$1.60
DESCRIPTORS *Academic Achievement, Correlation, Elementary Grades, Ethnic Groups, *Family Background, Racial Factors, *School Role, Secondary Grades, Social Background, Socioeconomic Status, Statistical Analysis, Student Attitudes, Student Characteristics, *Student Development, *Student Motivation

ABSTRACT

This paper analyzes the differences in the relative roles that family social background and family process variables play in the development of achievement and motivation at the individual and at the aggregate or school level. The particular data analysis model employed treated the attributes of the school a student attended as if they were his own attributes. Although this allowed correlations to be generated which formed the bases for regression and commonality analyses, it resulted in difficulties in interpreting the amounts of variability found for each source of variation. Although data was collected on grade levels one, three, six, nine, and twelve, the most reliabile results were for ninth graders. There is a pronounced tendency for students of similar social background to go to school together. This tendency is also pronounced for "Achievement," but not for "Motivation." In explaining the behavior of students and schools the same relative roles are played by the social background and family process sets of variables for expectations, attitude toward life, and study habits but not for educational plans and achievement. Differences in these relative roles at the individual and aggregate level may occur because already large relationships between social background and other variables are further accentuated when students are allocated schools on the basis of social background. (Authors/JM)

ED041072

Working Paper
Does Not Reflect
Official Policy of
The Office of Education

U.S. DEPARTMENT OF HEALTH, EDUCATION
& WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

OFFICE OF PROGRAM PLANNING AND EVALUATION

Division of Elementary and Secondary Programs

The Role of Family Background in the Development of Student Achievement and Motivation at the Individual and School Level

by

George W. Mayeske
Albert E. Beaton, Jr.
Tetsuo Okada
Wallace M. Cohen
Carl E. Wisler

UD010317

Technical Paper

Number 5

October 28, 1969

OFFICE OF EDUCATION/U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

6.0 The Role of Family Background in the Development of Student Achievement and Motivation at the Individual and School Level

This chapter develops in greater detail the concepts of differences among students, among schools and among students within schools that were touched upon in chapters two and five. These concepts have great importance in studying school influences. They indicate the maximum extent to which individual differences can be explained by differences in the characteristics of the schools students attend. For those who are interested in improving the achievement and motivational levels of school age children, these concepts indicate the extent to which the schools as they are currently constituted, may serve as a vehicle for bringing about these changes.

We can think of the differences among students in an attribute such as achievement, as being comprised of two parts. The first part is the extent to which the attribute is associated with the different schools students attend. For example, some schools will have a higher achievement average than other schools because they have a greater proportion of high achieving students. We can label this source of variation DAS to denote differences among schools. A second part represents the extent to which students within schools differ from one another in an attribute. Returning to our example of achievement we can recognize that in any school, regardless of the schools average, some students will have higher achievement scores than others. This source of variation we can label DWS to denote differences among students within schools. These two values then can be summed to give total differences among students, which we can label DAT. The equation then is of the form

(1) DAT = DAS + DWS

where DAT = differences among total students,

DAS = differences among schools

DWS = differences among students within schools

The term DAS is of particular interest to us when studying school influences because it represents the extent to which a particular attribute such as achievement, might be influenced by altering the characteristics of the schools. This term is obtained by squaring the correlation of the individual student variable with its school mean counterpart.* If for example, the correlation between individual student achievement and school mean achievement is .5, then .25 or 25 percent of the variance in individual student achievement is the maximum amount that can be explained by studying differences among schools. Since 1.00 is the maximum value that a correlation coefficient can assume, the amount that is left unexplained is 1.00 - .25 or .75. This latter amount is relegated to the term DWS (and to error). The DAS terms for different measures are given in section 6.1.

6.1 Percent of Variance in Individual Student Measures Associated With the Schools Students Attend

Table 6.1 gives the squared correlations between selected student measures and their school mean counterpart (i.e. DAS). These figures indicate the extent to which students who are similar with regard to the attribute go to school

---

*The data analysis model which yields these kinds of correlations was described in detail in chapter 2.

Table 6.1. - Percent of Variance in Individual Student Measures Associated With the Schools Students Attend*

Variable	Grade Levels 12	9	6	3	1	Average
Socio-Economic Status	26	26	25	38	35	30
Family Structure & Stability	8	12	15	19	14	14
Racial-Ethnic Group Membership	61	57	54	60	75	61
Expectations for Excellence	4	6	8	10	-	7
Attitude Toward Life	15	16	12	6	-	12
Educational Plans & Desires	8	9	10	7	-	8
Study Habits	6	10	13	14	-	11
Achievement	26	27	32	32	31	30
Number of Schools	780	923	2,372	2,453	1,302	
Number of Students	96,426	133,136	123,306	130,213	74,201	

All figures rounded to two places of decimals and decimal points omitted.

*It should be noted that analyses using a different data analysis model yielded slightly larger values (Mayeske, et.al., 1969). The kind of model that is most appropriate for these analyses is currently under investigation.

with one another. We can note that the aggregation of students into schools on the basis of their Racial-Ethnic Group Membership is quite pronounced, the simple average being 61 percent (obtained by dividing the sum of the percents by the number of grade levels). This is about twice the magnitude of the next highest value and reflects the tremendous racial imbalance in the public schools. The next highest values are for Socio-Economic Status and Achievement, with Family Structure and the motivational measures having much smaller values that are closer together in magnitude. Clearly, there are much greater differences among schools in the Social Background of their students (viz. their Socio-Economic Status, Family Structure and Racial-Ethnic Group Membership) than in their achievement and motivational levels. Perhaps the schools might serve better as a vehicle for social change, (by changing the social composition or mix of their students) than as a vehicle for altering their aspirations.

About 30 percent of the differences in Achievement are associated with the schools students attend.* A summary of the kinds of variables that are related to the Achievement levels of schools (see Chapter 4 of Mayeske, et.al., 1969) suggests that these differences too, reflect more a social problem than an educational problem. For example, some of the highest correlates of school Achievement are variables pertaining to the racial-ethnic composition of the teaching staff, the socio-economic and

---

*Later chapters compare these values for different racial-ethnic, sex, regional and rural-urban groupings of students and contrast these with figures presented in an earlier report (Coleman, et.al., 1966).

racial-ethnic composition of the student body, the teaching staff's scores on a vocabulary test, the kinds of problems that the teaching staff has with the student body, etc. Further, as was shown in the previous chapter, the Achievement levels of the schools are highly correlated with the students Social Background (as previously defined), the multiple correlation being about .93 at the ninth grade.

The next section compares individual student variables with their average school counterparts in their relative contributions to Achievement and motivation.

6.2 The Relative Contributions of Family Social Background and Process Variables at the Individual and School Level

In this section we ask the question "Do the same sets of variables play similar roles at the school level as at the individual level?" The extent to which the same variables play similar roles may tell us something about their relative importance. The extent to which the relative roles change in moving from the individual to the school level may tell us something about the nature of the variables in the aggregate that does not hold at the individual level. The term role is used to refer to the behavior of the unique and common portions of variance as described in the development of the commonality model in chapter 2.

Let us first focus on how we conduct total (T), among (A) and, within (W) school regressions. We recall from chapter 2 that the data analysis model being employed generates correlations among individual students, among schools and between individual students and the schools they attend.

For illustrative purposes let us assume that we want to conduct a regression analysis of Achievement (ACHV) on Socio-Economic Status (SES). The total (T) analysis for individual students is obtained using the correlations among students. The among (A) analysis is obtained using the correlations among schools. The within school analysis (W) is obtained by partialing out of individual Achievement its among school counterpart (using partial correlation techinques) and then regressing the adjusted or residual individual Achievement scores on individual SES. This technique of partialing school Achievement out of individual Achievement makes the adjusted or residual scores uncorrelated with (or independent of) differences among schools.

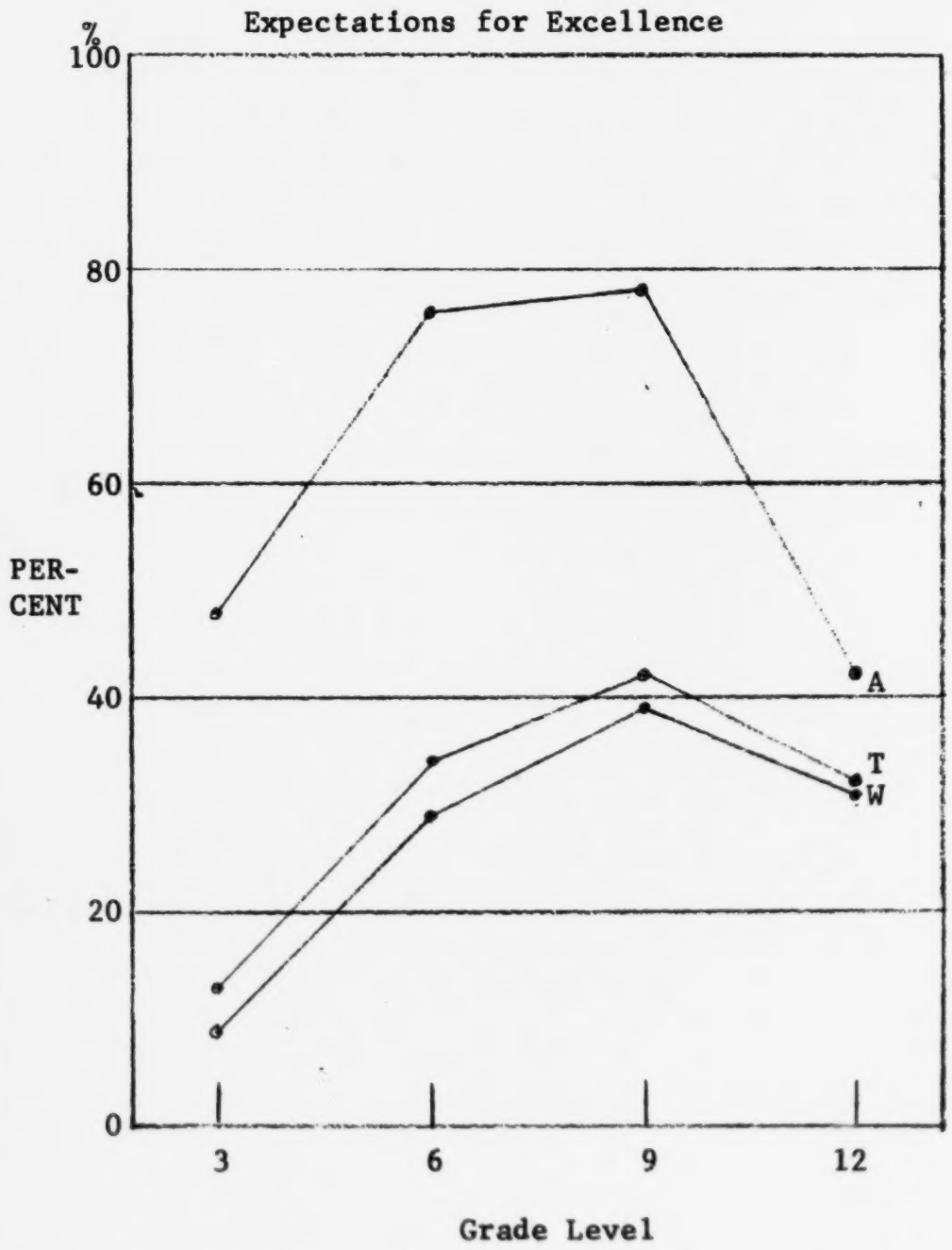
The sets of variables used in these analyses are the Social Background (SB) and Family Process (PRCS) sets that were used in previous chapters. At the school level the SB set refers to the Socio-Economic, Family Structure and Racial-Ethnic composition of the students and was called Student Body Social Background in the previous chapter. The PRCS set varies in its composition depending upon the dependent variable and this is so at the school level as well as at the individual level. For example, when school Achievement is the dependent variable the PRCS set includes the student body (or school average) variables of Expectations for Excellence, Attitude Toward Life, Educational Plans and Desires and Study Habits. Similarly, when school Expectations is the dependent variable the PRCS set includes the student body variables of Attitude Toward Life, Educational Plans, Study Habits and Achievement. The set of variables in the previous chapter called School Outcomes (SO) is similar to this set except that it was comprised of all five of these variables and consequently did not vary in its composition.

Figures 6.2.1 through 6.2.5 compare the squared multiple correlations obtained for the dependent variables from the T, A and W analyses at each grade level. In each case the regressor variables are the SB and PRCS sets combined (viz. a set of three SB and four PRCS variables, seven variables in all). The grade level trends in these figures must be interpreted with caution since the indices are better measured at the higher (9 and 12) than at the lower (3 and 6) grade levels. The indices at the ninth and twelfth grades are identical in composition so that changes occurring at these grade levels can be more readily assumed to represent real changes. Many of the changes that do occur from the ninth to twelfth grade reflect the loss of the lower achieving, less well motivated students who drop out of school.

Figure 6.2.1 presents the results of these analyses for Expectations and Attitude Toward Life. For both of these variables the A values are about one and one-half to three times greater than for the T and W analyses depending upon the grade level. For Expectations there is a dramatic drop in the A value at the twelfth grade.

Figure 6.2.2 compares the results of these same analyses for Educational Plans and Study Habits. Here the A values exceed the T and W analyses by a factor of about one and one-half to almost six, depending upon the grade level. Noticeable also here is the decline in the T, A and W values in moving from the ninth to twelfth grade. For Educational Plans, the decline is sharper for A than for T and W.

Figure 6.2.1. - Percent of Variation in Expectations for Excellence and Attitude Toward Life Accounted for by Family Social Background and Process Measures for Total (T), Among (A) and Within (W) Analyses



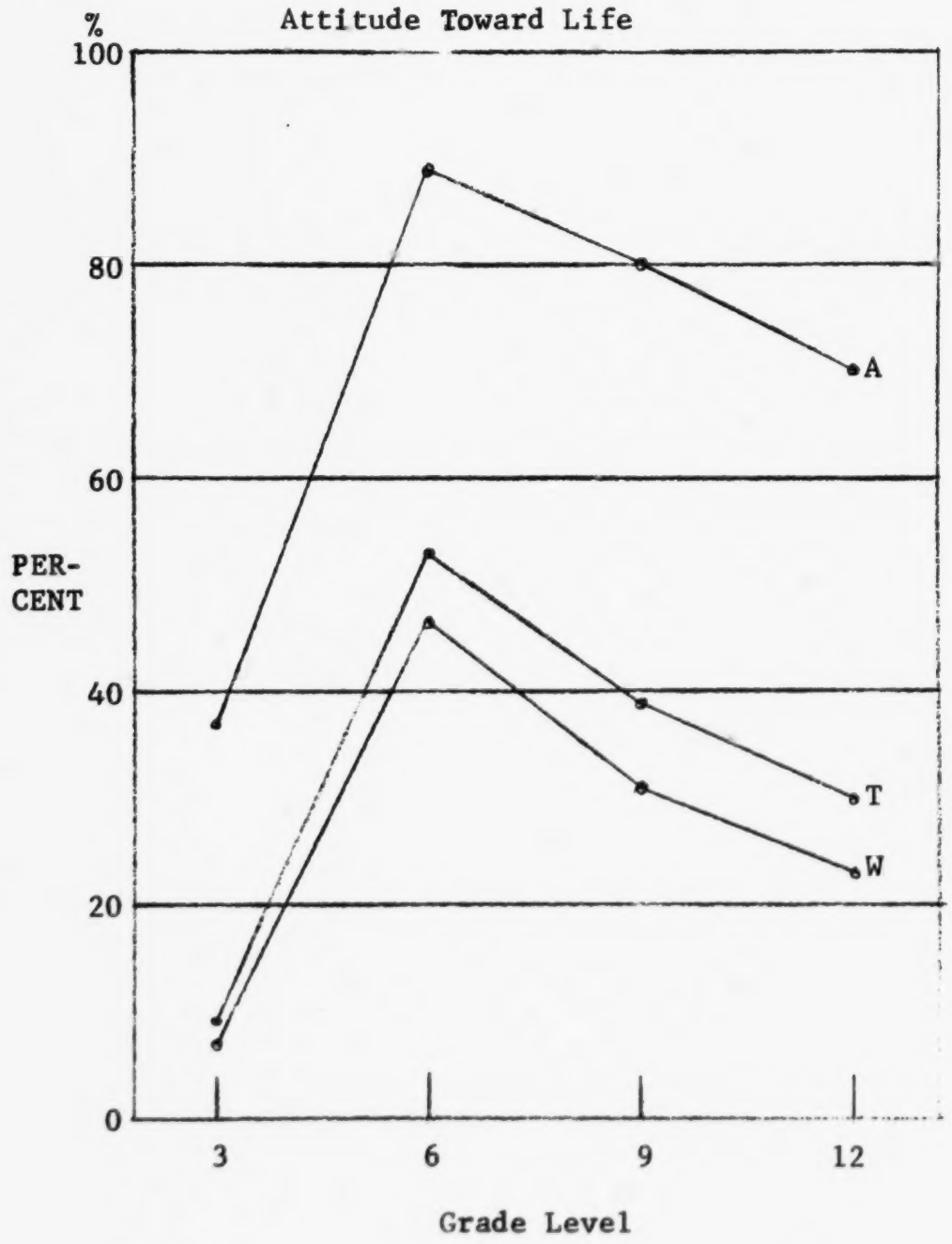
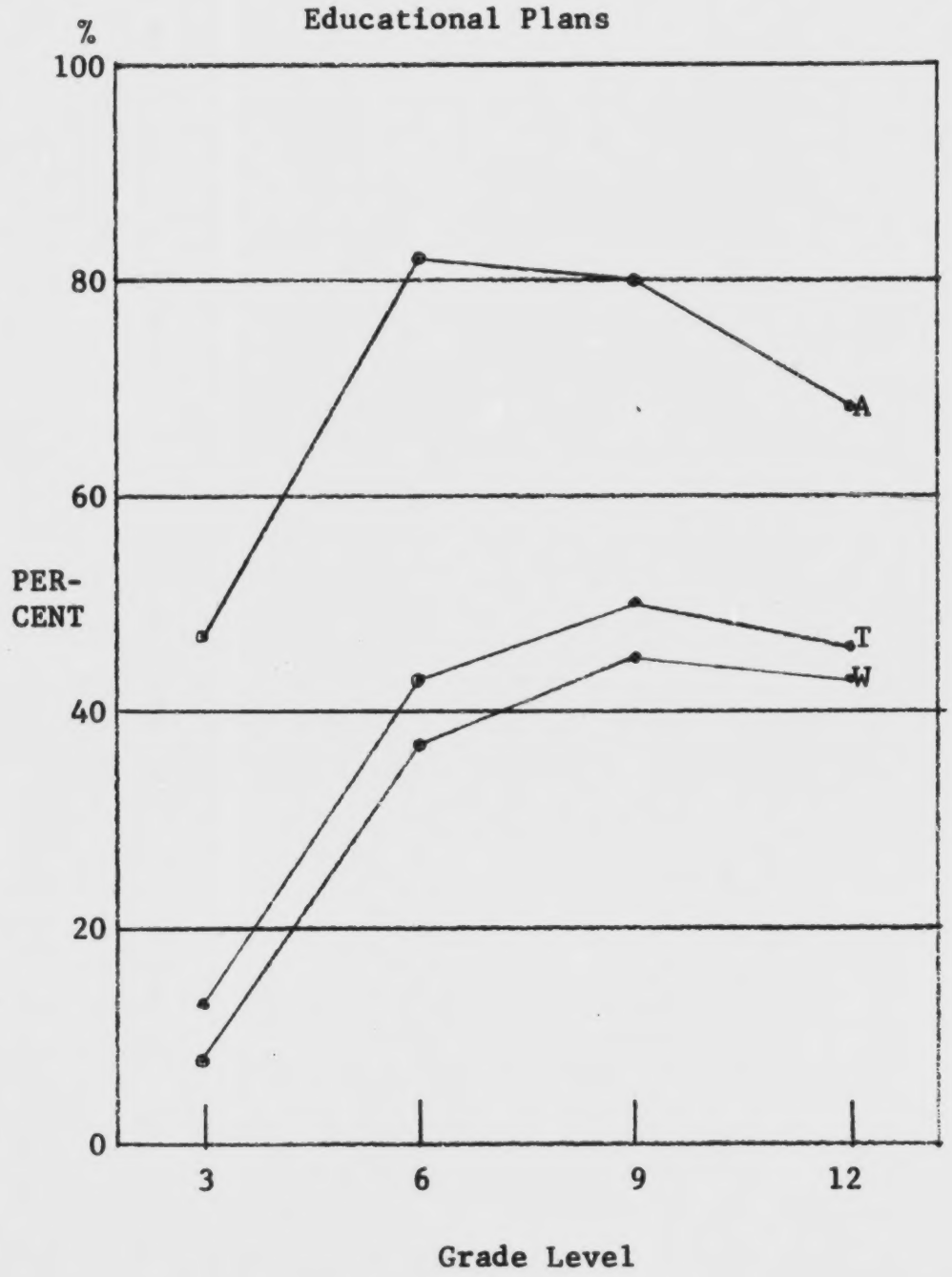


Figure 6.2.2. - Percent of Variation in Educational Plans and Study Habits Accounted for by Family Social Background and Process Measures for Total (T), Among (A) and Within (W) Analyses



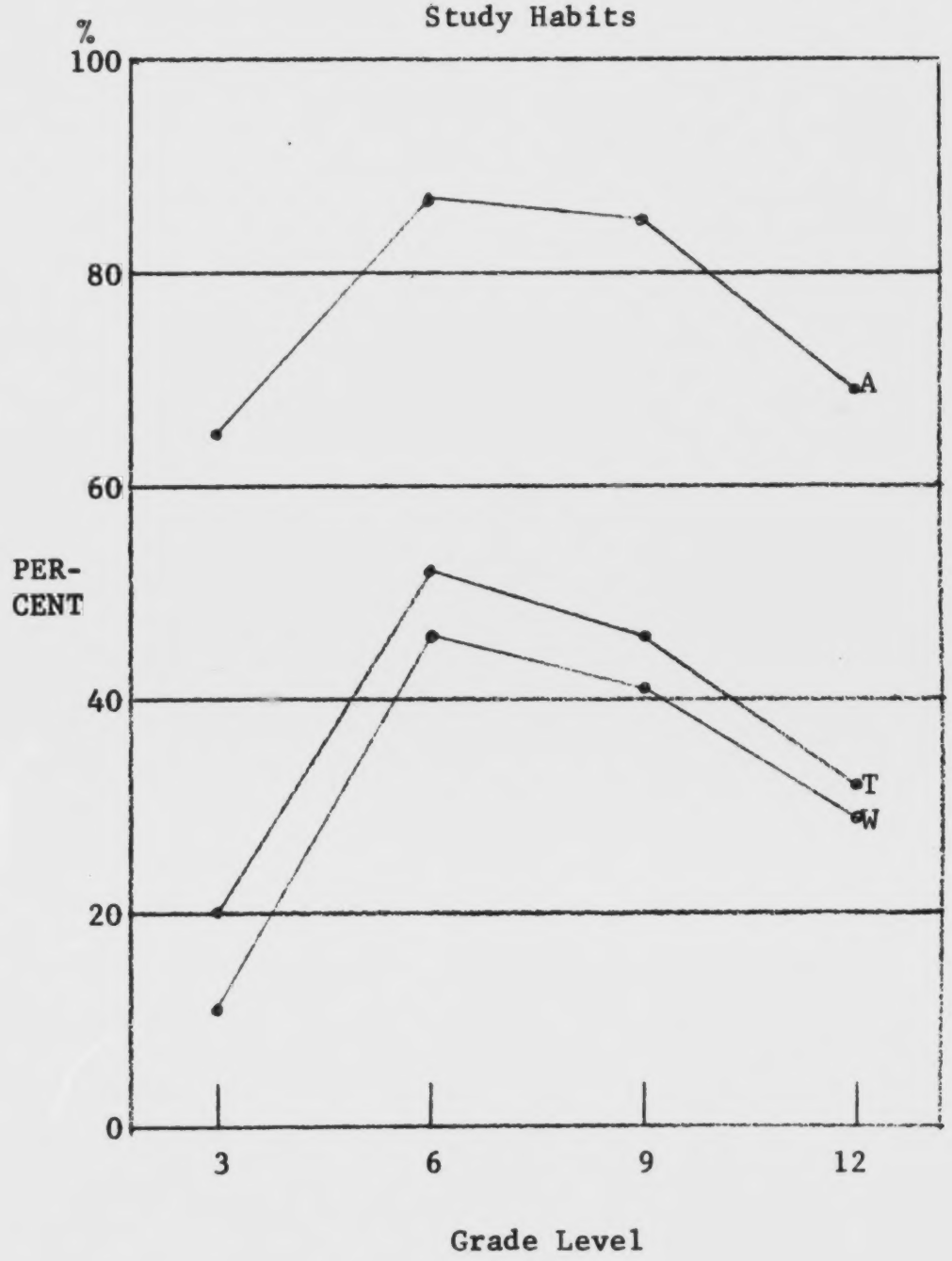
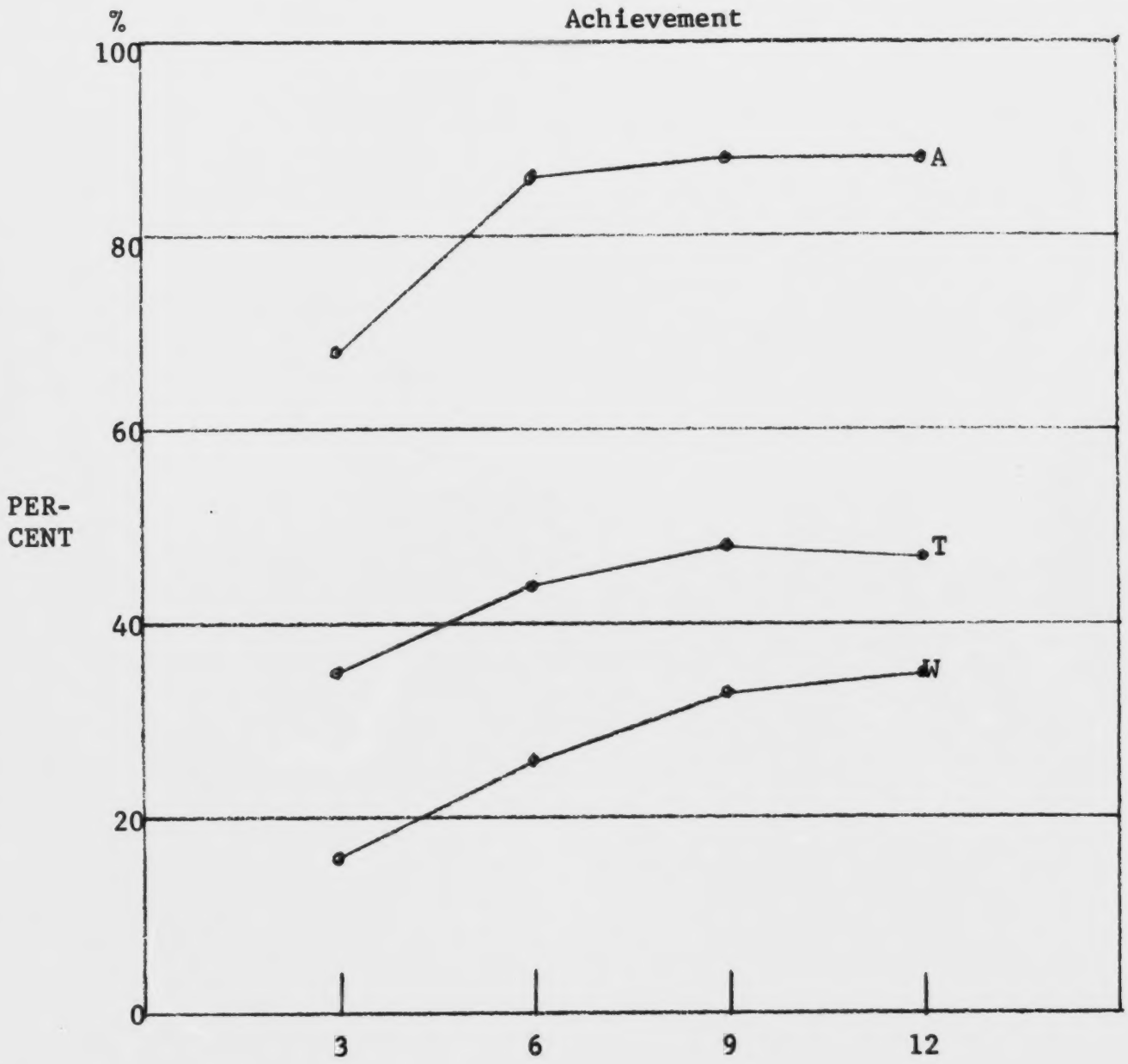


Figure 6.2.3 compares these analyses for Achievement. As with the other variables, the A values are about two to three times larger than the T and W analyses, depending upon the grade level. Unlike the other variables, however, the marked decline in all the values from the ninth to twelfth grade is not observed. Previous analyses (Mayeske, et.al, 1969) have suggested that most of the changes that occur from the ninth to twelfth grade reflect the loss of the dropouts. One might conjecture that without the loss of the dropouts Achievement would show an increase from the ninth to twelfth grade while the other measures would have less of a decline and might even have the same values at the ninth and twelfth grades (i.e. show a straight line from 9 to 12).

It is difficult to argue from this kind of analysis that the differences at each grade level or trends across grade levels represent an "aggregate effect" or student body influence. This is so because the relationships among the individual student and school variables are not entered explicitly into the analysis. Actually, analyses in Chapter 5 better illustrate possible student body influences.

In the preceding discussion it was pointed out that a within school analysis (W) is conducted by partialing out of the dependent variable its among school counterpart and then regressing these adjusted dependent variable scores on the variables of interest (e.g. in the earlier example, the school Achievement means were partialed out of individual student Achievement and then these adjusted Achievement scores were regressed against SES). This partialing operation makes the A and W analyses independent or uncorrelated. Unlike the variances DAS, DWS and DAT discussed in Table 6.1 which are additive, the results of multiple regressions at these different

Figure 6.2.3. - Percent of Variation in Achievement Accounted for by Family Social Background and Process Measures for Total (T), Among (A) and Within (W) Analyses



levels (T, A and W) are not additive as is evident from Figures 6.2.1 through 6.2.5 (viz. the squared multiple correlations for A and W will not sum to that observed for T).

The tables in the following pages present what are called "unitized" commonality analyses for these two sets of variables (viz. SB and PRCS) for total (T), among (A) and within (W) analyses. By "unitized" is meant that the comonality coefficients for each of the T, A, and W analyses have been divided by their respective squared multiple correlations (viz. R SQUARED (X1X2) so that the two unique portions and the common portion sum to 100. This "unitizing" operation has been performed to make the values more comparable because, as indicated by the preceding analyses, the absolute values of the commonality coefficients are much larger at the school level than at the individual level.*

---

*The absolute values for the different grade levels are given in section 14.5.

Table 6.2.1 presents "unitized" commonality analyses for Expectations and Attitude Toward Life. Inspection of the columns for Expectations shows that the percent of variance uniquely attributable to PRCS is dramatically greater than SB, for T, A, and W. This tendency is slightly more pronounced at grades six and nine and least pronounced at the third grade where the PRCS set of variables is least well represented. The percent uniquely attributable to the PRCS set is usually less for the A analyses than for the T and W. This is accompanied by higher common percents for these two sets in the A analyses. At the twelfth grade the percents in common drop by about one-half from their values at the sixth and ninth grades. We can conclude that for Expectations for Excellence the PRCS set plays a greater role than the SB set at both the individual (T & W) and aggregate (A) levels. However, at the aggregate (A) level, the unique role of the PRCS set is proportionately smaller and the common role proportionately larger than at the individual level (T and W).

For Attitude Toward Life as for Expectations, the unique role of the PRCS set dramatically outweighs the unique role of the SB set. In fact the unique role for SB drops to zero for W at the ninth and twelfth grades. For the PRCS set, the A percentages are usually smaller than the T and W percentages. Also the common percents for these two sets are usually larger for the A than for T and W. For Attitude Toward Life the relative roles of SB and PRCS are roughly similar at the individual and aggregate level (viz. PRCS larger than SB) except that,at the aggregate (A) level the unique percent is smaller for PRCS and the common percent for the two sets is much larger than at the individual (T and W) level.

Table 6.2.1. - Unitized Commonality Analyses of Family Social Background and Process Variables With Expectations for Excellence and Attitude Toward Life for Total, Among and Within Differences

Grade Level		Expectations: Percent Uniquely Attributable to: SB	Expectations: Percent Uniquely Attributable to: PRCS	Expectations: Percent in Common		Attitude Toward Life: Percent Uniquely Attributable to: SB	Attitude Toward Life: Percent Uniquely Attributable to: PRCS	Attitude Toward Life: Percent in Common
	T	6	72	22	T	7	53	40
12	A	7	62	31	A	7	27	66
	W	3	71	26	W	0	70	30
	T	2	52	46	T	3	49	48
9	A	2	33	65	A	2	24	74
	W	3	56	41	W	0	65	35
	T	3	53	44	T	2	49	49
6	A	2	28	70	A	2	22	76
	W	3	59	38	W	3	57	40
	T	15	46	39	T	11	56	33
3	A	4	42	54	A	8	38	54
	W	22	56	22	W	14	57	29

SB-Social Background; PRCS-Family Process
T-Total; A-Among; W-Within

Table 6.2.2 presents "unitized" commonality analyses for Educational Plans and Desires and Study Habits. Inspection of the columns under Educational Plans shows that the results here are somewhat different than they were for the previous measures. For Educational Plans we can note that the SB set plays a greater unique role than heretofore, especially at the ninth and twelfth grades while the PRCS set plays a greater role at the lower grade levels. Results at the third grade should be regarded lightly since the PRCS set is least well represented at that level. The fact that a trend of this nature exists over the grades at all suggests that as a student's Educational Plans become more crystallized at the higher grades SB plays an increasingly greater role. It is particularly important to note that at the higher grade levels the relative roles for these two sets change considerably in moving from the individual (T and W) to the aggregate (A) level. At the individual level (T and W) the unique value for the PRCS set considerably outweighs the unique value for the SB set. At the aggregate level, however, a reversal occurs and the unique role of the SB set outweighs that of the PRCS set. Also the common percent is usually greater for A than for T and W. Hence for Educational Plans the relative roles of SB and PRCS are not even roughly similar at the individual and aggregate levels. More will be said later concerning the meaning of these systematic differences.

For Study Habits the unique role for PRCS is usually consistently greater than for SB; there are, however, some definite grade level trends. The magnitude of PRCS increases at grades six and nine and then decreases again at grade twelve. When we look at the T, A and W analyses we can note that for all grades (expecially three, six and nine) the magnitude of the unique roles are smaller at the aggregate level

Table 6.2.2. - Unitized Commonality Analyses of Family Social Background and Process Variables With Educational Plans and Study Habits for Total, Among and Within Differences

Grade Level		Educational Plans: Percent Uniquely Attributable to: SB	PRCS	Percent in Common		Study Habits: Percent Uniquely Attributable to: SB	PRCS	Percent in Common
	T	15	48	37	T	25	38	37
12	A	38	18	44	A	20	33	47
	W	11	56	33	W	24	41	45
	T	12	40	48	T	13	37	50
9	A	26	13	61	A	9	15	76
	W	11	47	42	W	15	41	44
	T	3	51	46	T	4	46	50
6	A	4	22	74	A	1	23	76
	W	3	62	35	W	4	55	41
	T	0	62	38	T	20	30	50
3	A	2	36	62	A	11	11	78
	W	0	75	25	W	18	46	36

SB-Social Background; PRCS-Family Process
T-Total; A-Among; W-Within

(A) than at the individual level (T and W). The common percents are also much larger for A than for the others. We may conclude that for Study Habits, the similarity in the relative roles of these two sets at the individual (T and W) and aggregate (A) level depends in part, on the grade level under consideration. There is a greater correspondence between these levels of analysis (T, A and W) at grade twelve than at the lower grade levels. The overall trend, however, is for PRCS to play a greater relative role than SB, especially at the individual (T and W) level.

Table 6.2.3 presents "unitized" commonality analyses for Achievement. Inspection of this table shows that the trends we observe here are quite different than what we have observed for the previous measures. For Achievement it appears that the T, A and W analyses are quite different. For the T analyses, PRCS has a unique role that is about equal to or less than the unique role for SB, depending upon the grade level. For W, the unique role of PRCS is considerably larger than the unique role of SB (except at the third grade). For T and W, however, the common percentages for the two sets tend to be fairly similar. The A analyses display yet another trend and that is for the unique role of SB to considerably outweigh the unique role for PRCS and for the common percents to be larger for A than for T and W. For Achievement then the relative roles of SB and PRCS vary with the kind of analysis: for W, the unique role of PRCS considerably outweighs the unique role for SB; for A the opposite of this assertion prevails, viz. SB greater than PRCS; while T occupies an intermediate position with the unique roles of SB and PRCS being more nearly equal, particularly at the higher grades.

Table 6.2.3. - Unitized Commonality Analyses of Family Social Background and Process Variables With Achievement for Total, Among and Within Differences

Achievement

Grade Level		Percent Uniquely Attributable to: SB	PRCS	Percent in Common
12	T	32	34	34
	A	31	2	67
	W	9	63	28
9	T	29	23	48
	A	28	3	69
	W	12	46	42
6	T	41	18	41
	A	38	1	61
	W	19	43	38
3	T	57	12	31
	A	35	2	63
	W	44	25	31

SB-Social Background; PRCS-Family Process
T-Total; A-Among; W-Within

In summary, we have seen that for Expectations for Excellence and Attitude Toward Life, PRCS plays a greater unique role than SB at both the individual (T and W) and aggregate (A) levels and that these two sets have a larger common role at the aggregate level. This same statement tends to be true also for Study Habits. For Educational Plans and Achievement, however, some systematic differences appear at the individual (T and W) and aggregate (A) levels. At the individual level SB and PRCS behave with Educational Plans in a manner similar to the other motivational measures. However, at the aggregate (A) level (at grades nine and twelve) a reversal in the relative roles of these two sets occurs, SB now having a much larger unique role than PRCS. For Achievement only the within (W) analysis shows the characteristic pattern of PRCS having a greater unique role than SB while the among (A) analysis is just the opposite of this trend (viz. SB greater than PRCS) and the total (T) analysis is more nearly intermediate (viz. SB and PRCS being more nearly equal, particularly at the higher grades).

We might speculate for a moment about the meaning of these systematic similarities and differences. We recall from our earlier discussion that a school aggregate (or Student Body) variable is formed by averaging the scores on that variable for the students in a school. This averaging process masks differences among students within schools. Differences among these averages then reflect the extent to which schools, not students, differ on this attribute. There is no reason to expect analyses at the school level to display the same regularities as analyses at the individual level although Robinson (1950) has noted the conditions under which these different levels of analysis will yield similar results. What these analyses

have shown is the extent to which the relative roles of these two sets of variables are altered in moving from the individual to aggregate level. One possible explanation of why these alterations occur for some dependent variables more than for others might run somewhat as follows: (1) at the individual level some of the dependent variables are more highly related than others to the SB variables of Socio-Economic Status, Family Structure and Racial-Ethnic Group Membership (see Tables 4.1.1, 4.1.2 and 4.1.3); (2) students are aggregated into schools on the basis of their Social Background to a very large extent (see Table 6.1); (3) consequently any relationships between Social Background and other variables that are large at the individual level will be further increased by the nature of this assignment, and; (4) may override other relationships that were large at the individual level but were not involved in this assignment rule. This kind of reasoning may explain the reversals in the relative roles of SB and PRCS at the individual and aggregate level for Achievement and Educational Plans since these are more highly related to SB than the other dependent variables at the individual level(as shown in Tables 4.1.1 through 4.1.3). That this is not the only explanation is evidenced by the high relationship of Study Habits with Family Structure (Table 4.1.2). Of course Table 6.1 shows that Family Structure is not highly related to the schools students attend.

6.3 Summary

This chapter showed the differences in the relative roles that Family Social Background and Process variables play in the development of achievement and motivation at the individual and at the aggregate (or school) level.

The motivational measures used were those that referred to the expectations that the student, his parents and teachers hold for his school performance (called Expectations for Excellence); the outlook on life that he holds as to the opportunities that are available to him and what he might be able to accomplish with a good education (called Attitude Toward Life); the aspirations that both he and his parents have for his pursuit of further schooling, including college (called Educational Plans and Desires) and; the amount of time or frequency with which he pursues different intellectual activities such as reading, doing homework, discussing his schoolwork with his parents and watching TV (called Study Habits). The measure of achievement was a composite of the students' scores on tests of verbal and non-verbal ability, reading comprehension, mathematics achievement and a test of general information.

The family background factors were those that referred to: the parents' education, father's occupation, size of family, number of rooms in the home and intellectually stimulating resources in the home such as books, magazines, newspapers, TV and radio (called Socio-Economic Status); whether or not both parents were in the home, which parent provided the major source of income and how frequently the family has moved around (called Family Structure and Stability); whether the student was white;

Oriental, Negro, Mexican, Puerto-Rican or Indian (called Racial-Ethnic Group Membership). When these three factors are taken as a group they are called the individual student's social background (SB).

The motivation measures contain many references to aspirations that parents have for their children and of activities that they participate in with them. The Achievement measure may reflect, in part, the degree of verbalness of the family environment. These variables were used as the Family Process (PRCS) set. The composition of this set varied with the dependent variable. For example, when Achievement was the dependent variable the Process (PRCS) set included the four motivational measures and when Expectations was the dependent variable the PRCS set included Achievement plus the three other motivational variables.

The particular data analysis model employed treated the attributes of the school a student attended as if they were his own attributes. This allowed correlations to be generated which formed the basis for regression and commonality analyses. Commonality analysis allows an investigator to partition the amount of variance in a dependent variable (the squared multiple correlation) into the proportion that can be uniquely attributed to each of the sets of variables in the analysis and the proportion that is in common to each of the possible combinations of the variables. It is difficult to place any one interpretation on the common portions. To some extent they might represent a mutual interplay of the variables but also to some extent they represent an inability to separate out the influence of one set from another because in the groups under study, as they currently exist, the presence of one attribute is often accompained by the presence of the other attribute. For example, students from the lower socio-economic

strata are more likely to have a less intact family structure, to be less well motivated and have lower achievement as illustrated in the previous chapters.

The percent of each variable that was associated with differences among schools was computed by squaring the correlation of each individual student variable with its school mean counterpart. For example, if the correlation between individual student achievement and average school achievement is .5, then .5 squared, or 25 percent of the variance in student achievement is the maximum that can be explained by variables based upon differences among schools. For those who are interested in improving the achievement and motivational levels of school age children, these percentages indicate the extent to which the schools (as they are currently constituted) may serve as a vehicle for bringing about these changes. They are given below for ninth grade students since the indices are measured best at the ninth and twelfth grades, however, those students who dropout of school are usually still present at the ninth grade.

Variable	Percent of Variance Associated with the Schools Students Attend
Socio-Economic Status	26
Family Structure and Stability	12
Racial-Ethnic Group Membership	57
Expectations for Excellence	6
Attitude Toward Life	16
Educational Plans and Desires	9
Study Habits	10
Achievement	27

These figures show that there is a pronounced tendency for students of similar Social Background (Socio-Economic Status, Family Structure and Racial-Ethnic Group Membership) to go to school with one another. This tendency is also pronounced for Achievement while the motivational measures have values that are much smaller in magnitude. Percentages similar to these were also observed for the other grade levels.

In order to show the relative roles (and perhaps the relative importance as well) of the SB and PRCS sets at the individual and aggregate (or school) level comparative analyses were conducted for differences among students (designated T for Total), differences among schools (designated A for Among), and differences among students within schools (designated W for Within). For a T analysis, correlations based upon differences among individual students are used; for an A analysis correlations based upon differences among school means (or averages) are used and, for a W analysis, correlations among individual students are used after partialing out of the dependent variable, using partial correlation techniques, its among school counterpart. For example, a W analysis of Achievement would partial school Achievement out of individual student Achievement and then regress these adjusted scores against other individual measures, such as SES. The adjusted scores obtained by this partialing operation are unrelated to (or independent of) differences among schools. The T and W analyses are referred to as analyses at the individual level while the A analyses are called aggregate analyses.

Comparative commonality analyses of T, A and W differences for the SB and PRCS sets are given below for the ninth grade. The correlations at the A level were usually much larger than at the T or W level. For example, the squared multiple correlation between Achievement and Family Social Background and Process measures was 48 at the T level and 88 at the A level, for the ninth grade. In order to make analyses at these levels more comparable a "unitizing" operation was performed by dividing the commonality coefficients by their respective squared multiple correlation. This "unitizing" operation made the unique and common coefficients sum to 100 for each of the T, A and W analyses (i.e. deals only with the percent of "explained" variance). The following results in terms of the percentages uniquely attributable to SB and PRCS and their common percent, were obtained for the different dependent variables.

Expectations for Excellence

Type of Analysis	Percent Uniquely Attributable to: SB	PRCS	Percent in Common
T	2	52	46
A	2	33	65
W	3	56	41

These percentages show that the SB and PRCS sets maintain their same relative roles at the individual (T and W) as at the aggregate (A) level with the restriction that the unique role of PRCS is proportionately smaller and the common role proportionately larger at the A level than at the T and W level. These same relative roles were observed at the other grade levels except that there was a tendency for the percents attributable to SB and PRCS to increase and the common percent to decrease

at the higher grade levels. Clearly, however, the PRCS set plays a large role for both individual and aggregate Expectations.

Attitude Toward Life

Type of Analysis	Percent Uniquely Attributable to: SB	PRCS	Percent in Common:
T	3	49	48
A	2	24	74
W	0	65	35

For Attitude Toward Life the relative roles of SB and PRCS are roughly similar at the individual (T and W) and aggregate (A) levels in that PRCS dramatically outweighs SB. However, at the A level the unique percent for PRCS is smaller and the common percent much larger than at the T and W level. Roughly similar trends were observed at the other grade levels. As with Expectations, the PRCS set plays a large role for both individual and aggregate Attitude Toward Life.

Educational Plans and Desires

Type of Analysis	Percent Uniquely Attributable to: SB	PRCS	Percent in Common:
T	12	40	48
A	26	13	61
W	11	47	42

For Educational Plans and Desires a reversal occurs in the relative roles of SB and PRCS in moving from the individual (T and W) to the aggregate level. At the individual level PRCS considerably outweighs SB while at the aggregate level the reverse is true. The percent in common is also larger at the A level. This tendency for SB to be larger

at A than at the T and W level first occurs at the ninth grade but becomes even more pronounced at the twelfth grade. Perhaps this reversal is related in some manner to the crystallization of Educational Plans of a large proportion of the student body at the higher grade levels.

Study Habits

Type of Analysis	Percent Uniquely Attributable to:		Percent in Common
	SB	PRCS	
T	13	37	50
A	9	15	76
W	15	41	44

For Study Habits the unique role of PRCS is consistently greater than for SB, however, these differences are less pronounced and the common percent more pronounced at the A level than at the T and W level. Definite grade level trends were discerned with the similarity in the relative roles for these sets at T, A and W levels being greater at the higher than at the lower grades. We may conclude, however that PRCS plays a greater role than SB at all grade levels.

Achievement

Type of Analysis	Percent Uniquely Attributable to:		Percent in Common:
	SB	PRCS	
T	29	23	48
A	28	3	69
W	12	46	42

For Achievement quite different results are obtained for T, A and W. For A, SB dramatically outweighs PRCS, for W the reverse of this assertion

is true (viz. PRCS outweighs SB) while for T, SB and PRCS are on a more nearly equal footing. As with the other dependent variables the common percent is larger at the aggregate than at the individual level. Roughly similar trends were observed for the other grade levels. For Achievement then we can conclude that the relative roles of SB and PRCS will vary with the type of analysis (T, A and W) rather than being similar at the individual and aggregate level.

In summary, we have seen that for Expectations, Attitude Toward Life and to a lesser extent Study Habits, about the same relative roles are played by the SB and PRCS sets of variables for differences among students (T), among schools (A) and among students within schools (W). The trend observed was for the unique role of the PRCS set to heavily outweigh the unique role of the SB set. For Educational Plans these same statements are applicable at the individual level (T and W) while at the aggregate (A) level a reversal occurs and SB plays a greater unique role than PRCS. Still different results are obtained for Achievement. Only for the W analysis does the unique role of PRCS outweigh that of SB; for A the reverse occurs (SB greater than PRCS) while for T, SB and PRCS are on a more nearly equal footing. Thus, in explaining the behavior of students and schools the same relative roles are played by the Social Background (SB) and Family Process (PRCS) sets of variables for Expectations, Attitude Toward Life and Study Habits but not for Educational Plans and Achievement. It is suggested that differences in these relative roles at the individual and aggregate (school) level occur because relationships that are large between the student's Social Background (SB) and other variables (e.g. Achievement) are further accentuated when students are allocated into schools on the basis of their Social Background.

List of References

Coleman, J. L. et.al., Equality of Educational Opportunity, National Center for Educational Statistics. U.S. Government Printing Office, Washington, D.C., 1966 Catalog No. FS5.38001 and Supplement.

Mayeske, G. W. et.al., A Study of Our Nation's Schools, Washington, D.C., U.S. Government Printing Office, In Press.

Robinson, W. S., Ecological correlations and the behavior of individuals. American Sociological Review, 1950, 15(3), 92-107.